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Online Echo Chambers, Online Epistemic Bubbles, and Open-Mindedness

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Abstract

This article is an exercise in the virtue epistemology of the internet, an area of applied virtue epistemology that investigates how online environments impact the development of intellectual virtues, and how intellectual virtues manifest within online environments. I examine online echo chambers and epistemic bubbles (Nguyen 2020, *Episteme* 17(2), 141–61), exploring the conceptual relationship between these online environments and the virtue of open-mindedness (Battaly 2018b, *Episteme* 15(3), 261–82). The article answers two key individual-level, virtue epistemic questions: (Q1) How does immersion in online echo chambers and epistemic bubbles affect the cultivation and preservation of open-mindedness, and (Q2) Is it always intellectually virtuous to exhibit open-mindedness in the context of online echo chambers and epistemic bubbles? In response to Q1, I contend that both online echo chambers and online epistemic bubbles threaten to undermine the cultivation and preservation of open-mindedness, albeit via different mechanisms and to different degrees. In response to Q2, I affirm that both a deficiency and excess of open-mindedness can be virtuous in these online environments, depending on the epistemic orientation of the digital user.

Keywords: Echo chambers; filter bubbles; open-mindedness; virtue epistemology; normative contextualism

C. Thi Nguyen (2020) makes a canonical distinction between epistemic bubbles and echo chambers. Epistemic bubbles are epistemic environments in which some relevant intellectual options have been *omitted* (Nguyen 2020: 142), whereas echo chambers are epistemic environments in which some relevant intellectual options have been *actively discredited* (Nguyen 2020: 142). The epistemic environments in both cases can be physical environments, such as educational institutions and rural communities, or virtual environments, such as online message boards and social media sites. This paper focuses on *online* echo chambers and *online* epistemic bubbles, or cases in which the epistemic environment in question is a virtual environment facilitated by technological mediation. Both online echo chambers and epistemic bubbles are associated with a number of negative epistemic consequences. On a societal level, these epistemic structures can lead to group polarization and subvert the project of deliberative democracy (Bozdag

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and van den Hoven 2015; Sunstein 2017). On an individual level, they can reinforce cognitive biases, such as confirmation bias and availability bias, and have a negative impact on critical thinking. This paper explores the individual-level relationship between these epistemic environments and intellectual virtue, focusing on the virtue of open-mindedness. The article is thus a project in *applied virtue epistemology*.

Applied virtue epistemology investigates the impact and relevance of intellectual virtue in practical situations and everyday life in domains such as education (Clemente 2022), scientific research (Paternotte and Ivanova 2017), politics (Boult 2021), healthcare (Marcum 2017), mathematics (Rittberg 2021), and technology (Vallor 2016). Applied virtue epistemology includes what might be called *the virtue epistemology of the internet* (Heersmink 2018), which examines both (a) how the internet and online environments impact the cultivation and maintenance of intellectual virtue (e.g., what intellectual virtues are most threatened by the use of the internet) and (b) how the exhibition of intellectual virtue impacts the manner in which digital users navigate the internet and online environments (e.g., what intellectual virtue looks like in the context of online environments and what virtues are most necessary for pursuing knowledge effectively on the internet).¹ This article addresses both (a) and (b), where the online environments under consideration are online echo chambers and epistemic bubbles, and the intellectual virtue under consideration is open-mindedness. The conceptual analysis presented in the article is guided by the following two questions:

- (Q1) How (if at all) does being immersed in online echo chambers and epistemic bubbles affect the cultivation and preservation of open-mindedness?
 (Q2) Is it always intellectually virtuous to behave open-mindedly in the context of online echo chambers and epistemic bubbles?

In response to Q1, I contend that both online echo chambers and epistemic bubbles threaten to undermine the cultivation and preservation of open-mindedness, albeit via different mechanisms and to different degrees. In response to Q2, I affirm that both a deficiency and an excess of open-mindedness can be virtuous in the context of these online environments, depending on the epistemic orientation of the digital user. Specifically, I argue that (a) closed-mindedness (i.e., a deficiency of open-mindedness) can be virtuous when a digital user has not been corrupted by an epistemically hostile online echo chamber or epistemic bubble and is trying to responsibly navigate the environment (Battaly 2021), and (b) an excess of open-mindedness can be virtuous when a digital user has been corrupted by an epistemically hostile echo chamber and needs to escape the environment (Nguyen 2020).² This bifold response to Q2 is a demonstration of what Kidd (2020) calls *normative contextualism*, the idea that the normative status of cognitive character traits is contingent on the context in which these traits are manifested.

The remainder of this paper is organized as follows. Section 1 unpacks Nguyen's concepts of echo chambers and epistemic bubbles before homing in on and explaining

¹Shannon Vallor (2010, 2016) investigates digital technologies and the internet from the perspective of virtue ethics. The virtue epistemology of the internet is the epistemological equivalent of this philosophical endeavor.

²This article is exclusively concerned with the *epistemic* effects of open-mindedness, not the moral or pragmatic effects. See Ferkany (2019) for a contractualist argument for why open-mindedness is not always a *moral* virtue.

some of the unique features of the online versions of these social epistemic structures. Sections 2 and 3 address Q1. The former section explains how online epistemic bubbles threaten to undermine the cultivation and preservation of open-mindedness via a bootstrapped corroboration mechanism, whereas the latter explains how online echo chambers threaten to do so via an epistemic discrediting mechanism (Nguyen 2020). Section 4 addresses Q2, illustrating how, depending on the epistemic orientation of the digital user, both a deficiency and an excess of open-mindedness can be virtuous in the context of online echo chambers and epistemic bubbles. Section 5 interconnects the responses to Q1 and Q2, demonstrating how the analysis in reply to Q1 can be repurposed as an objection to the conclusion in reply to Q2 and vice versa. Addressing these objections offers an opportunity to demonstrate how the conceptual analyses in response to both questions cohere together and elucidates the significance of two epistemological debates that directly bear on Q1 and Q2: the debate over relevancy restrictions on intellectual options for the virtue of open-mindedness (Battaly 2018b) and the debate over whether echo chambers and epistemic bubbles are always epistemically problematic (Sheeks 2023). Section 6 concludes.

1. Online epistemic bubbles and online echo chambers

Nguyen (2020) distinguishes between “epistemic bubbles” and “echo chambers,” arguing that these two concepts have often been conflated in the pertinent literature. According to Nguyen, epistemic bubbles are epistemic environments in which certain intellectual options or viewpoints have been excluded, whereas echo chambers as epistemic environments in which certain viewpoints or intellectual options have been actively discredited. Both types of social epistemic structure can reinforce existing beliefs and insulate individuals from different perspectives. However, their mechanics differ; while epistemic bubbles are characterized by simple ignorance of contrary intellectual options, echo chambers involve an active distrust of such options.³

Epistemic bubbles and echo chambers can be physical (analogue) environments or virtual (online) environments. Possible examples of analogue epistemic bubbles include isolated tribal communities that have limited exposure to differing viewpoints, and friend groups with similar worldviews who do not seek out or engage with differing opinions. Possible examples of analogue echo chambers include cults and radical political groups that routinely delegitimize and demonize all opposing ideological perspectives. In fact, Nguyen compares the formation of echo chambers to the process of cult indoctrination, claiming that in both cases, in-group members become intellectually isolated from the rest of the world, at least surrounding some topic X, by being taught to distrust outsiders.⁴ In this article, I focus on online echo chambers and online epistemic bubbles, although the basic conceptual analysis presented here generalizes and

³Furman (2023) introduces the concept of an “epistemic bunker” and explicitly contrasts it with the concepts of “echo chambers” and “epistemic bubbles.” Epistemic bunkers are epistemic environments that are structured to keep its members safe. They accomplish this end by amplifying the “credibility of testimony from internal actors and diminish[ing] the credibility of those outside, sometimes blocking external testimony entirely” (Furman 2023: 199). Furman explains that not all epistemic bunkers are echo chambers or epistemic bubbles, and not all echo chambers or epistemic bubbles are epistemic bunkers.

⁴Elzinga (2022) identifies two types of feedback loops that typify echo chambers: *intra-network* feedback loops and *inter-network* feedback loops. Intra-network feedback loops occur between members within an echo chamber, amplifying relations of trust among them. Inter-network feedback loops are established between members of an echo chamber and those outside it, intensifying the distrust members have for

applies to analogue versions of these epistemic environments. The decision to focus on online echo chambers and epistemic bubbles instead of analogue ones is principally due to two reasons. First, since we are spending more of our lives online, it is increasingly in the context of online environments that we are forming beliefs and shaping our epistemic profiles. Second, online echo chambers and epistemic bubbles can exist on a far larger scale than their analogue counterparts, involving millions of users worldwide.⁵ While online echo chambers and epistemic bubbles are commonly found on social media sites like Twitter and Facebook, they are not restricted to such digital platforms. Any online space where information is shared has the potential to become an echo chamber or epistemic bubble. Examples include online forums (e.g., Reddit and Quora), news blogs, video-sharing platforms, online gaming communities, online marketplaces, and review sites.

Online *epistemic bubbles* can be algorithmically manufactured, self-manufactured via one's own digital actions, or a combination thereof. Starting with a case of pure self-generation: a Facebook user who only adds friends who share their political perspectives will gradually curate a politically biased newsfeed that takes the shape of an online epistemic bubble through their own intentional digital actions. Oftentimes though, online epistemic bubbles are externally (and passively) generated via algorithmic means. An online epistemic bubble that is created exclusively through algorithmic personalization is synonymous with Eli Pariser's (2011) concept of a *filter bubble*. In describing filter bubbles, Pariser says, "They [i.e., the algorithms] are prediction engines, constantly creating and refining a theory of who you are and what you'll do and want next. Together, these engines create a unique universe of information for each of us – what I've come to call a filter bubble – which fundamentally alters the way we encounter information online" (Pariser 2011: 9). The emergence of filter bubbles is largely a consequence of what Zuboff (2019) calls *surveillance capitalism*, a new type of capitalism wherein tech companies harvest surplus behavioral data from digital users to produce personality profiles (or prediction models) that are sold to advertisers and data brokers as a medium of economic transaction.

The advertising business model upon which surveillance capitalism is founded motivates tech companies to capture consumer attention as a means of optimizing the data acquisition process (Lanier 2018). Notably, the notion of an "attention economy" is not novel. Ad-based business models trace back to at least the 1830s and have been utilized by newspapers, talk radio stations, and broadcast television programs for decades. What is new about the *online* attention economy is the advent of Big Data and the development of personalization algorithms via machine-learning techniques. Older forms of media like television and radio relied upon surveys and other forms of market research like Nielsen ratings to collect data about consumer preferences. These data-acquisition methods were relatively crude because they only permitted advertisers to target

outsiders. So, both feedback loops play a role in fostering the distinctive relations of trust and distrust that define echo chambers.

⁵Although not directly relevant to this article, it is worth considering how digital features such as anonymity, permeability, and gamification distinguish online echo chambers and epistemic bubbles from analogue ones. Online anonymity often motivates individuals to engage in more aggressive or harmful behavior than they would otherwise engage in due to a lack of accountability. Further, online echo chambers and epistemic bubbles may be more permeable compared to their analogue counterparts given that they lack physical barriers, enabling individuals to move in and out more easily. However, the digital gamification features of online platforms might also increase the likelihood of becoming immersed in online echo chambers and epistemic bubbles compared to analogue ones (Nguyen 2021).

consumers on a group level by appealing to the shared interests among them. By contrast, contemporary algorithmic filtering mechanisms monitor users' online behavior via their digital footprint to generate increasingly customized content that aligns with their pre-established preferences. This algorithmic process of content customization on internet platforms gives rise to "filter bubbles" in Pariser's sense of the term. Put differently, in the process of delivering customized digital content that aligns with a subject's pre-established personality profile, personalization algorithms inevitably omit certain intellectual options from a subject's newsfeed or timeline, thereby creating an online epistemic bubble.

Unlike online epistemic bubbles, online echo chambers arguably cannot passively result from algorithmic filtering mechanisms. While online echo chambers are, strictly speaking, facilitated through technological and algorithmic mediation, Nguyen explains that the formation of echo chambers often, if not always, involves an element of active human manipulation. This is because echo chambers serve as potent instruments to wield power via control over knowledge, making it likely in Nguyen's opinion that they are intentionally established and sustained to achieve this end.⁶ Notably, Nguyen's (and by extension my own) use of the term "echo chamber" differs from Cass Sunstein's (2001) influential conception of the term. According to Sunstein, an echo chamber is any social network in which individuals are exclusively exposed to perspectives that confirm their existing values and beliefs. This conception of the term aligns more closely with Nguyen's concept of an "epistemic bubble" than his own concept of an "echo chamber," according to which individuals with similar views are exposed to opposing perspectives, but these perspectives are marketed to them as ludicrous and untrustworthy.

Before introducing the virtue of open-mindedness and addressing Q1 and Q2, a few qualifications are in order. First, it is not a binary matter as to whether one is a member of an online echo chamber or epistemic bubble. Many digital users gradually fall into these online environments in the sense that their beliefs and cognitive character traits are warped by their mechanics over time. Second, this article primarily concerns the *conceptual relationship* between online epistemic bubbles, online echo chambers, and open-mindedness, not the *empirical literature* surrounding such online environments. I do not take a stand on how prevalent online echo chambers or epistemic bubbles are, or which type of online environment is the most common. However, as will be briefly discussed in the next section, recent empirical research suggests that there is little evidence to support the widespread existence of online epistemic bubbles.

2. Online epistemic bubbles as a risk to open-mindedness

To repeat, this article is an exercise in applied virtue epistemology; in particular, a sub-field of applied virtue epistemology called *the virtue epistemology of the internet* (Heersmink 2018). One of the primary aims of the virtue epistemology of the internet is to ask, with respect to any given intellectual virtue X, how does online environment Y affect the development and maintenance of X and what does the virtuous manifestation

⁶See Munroe (2023) for a critical analysis of Nguyen's conception of echo chambers and epistemic bubbles. Munroe contends that Nguyen's conceptual analysis of echo chambers and epistemic bubbles is inordinately cognitive and does not sufficiently emphasize the affective dimensions of social epistemic structures. See Figà Talamanca and Arfini (2022) for a critical analysis of *online* echo chambers and *online* epistemic bubbles in particular.

of X look like in the context of Y? This article focuses on these questions in relation to open-mindedness and its operation within online echo chambers and epistemic bubbles. Such questions can be represented as follows:

(Q1) How (if at all) does being immersed in online echo chambers and epistemic bubbles affect the cultivation and preservation of open-mindedness?

(Q2) Is it always intellectually virtuous to behave open-mindedly in the context of online echo chambers and epistemic bubbles?

To begin to answer Q1 and Q2, it is necessary to provide a brief conceptual analysis of open-mindedness (OM for short). Numerous conceptual analyses of open-mindedness exist in the virtue epistemology literature (Baehr 2011*b*; Fantl 2018; Kwong 2016; Riggs 2010). Following Heather Battaly (2018*b*), I will choose to understand the cognitive character trait of OM as a “disposition to engage seriously with relevant intellectual options” (266) and the trait of closed-mindedness (CM for short) as “an unwillingness or inability to engage seriously with relevant intellectual options” (268).⁷

Some important points concerning this definition need to be unpacked. First, like other intellectual virtues, such as epistemic autonomy and perseverance, OM is a cognitive character trait acquired and developed via the habitual performance of skillful intellectual actions. One-off displays of OM are thus not sufficient for possessing the disposition of OM. Further, OM is not necessarily a *general* psychological disposition but can also be a *domain-specific* disposition, meaning that the trait may be limited to a particular cognitive domain. For example, a person may be open-minded with respect to certain truths, such as the reality of climate change, but closed-minded concerning other truths, such as the reality of systemic racism. The virtue of OM also includes *relevancy restrictions* on intellectual options, meaning that subjects are not closed-minded if they fail to entertain and engage seriously with *irrelevant* intellectual options. Which intellectual options count as “relevant” for a subject is a controversial epistemological matter and will become significant later on in the paper (see Sections 3 and 5). However, there are clear-cut examples of intellectual options that most would agree are “irrelevant” in the relevant sense. For instance, a person intuitively does not lack OM if they habitually dismiss the perspective of a Nazi who denies the existence of the Holocaust or that of a conspiracy theorist who alleges that the earth is flat. These intellectual options (i.e., “The earth is flat” and “The holocaust never happened”) are taken to be absurd by all reasonable people and so can be dismissed as irrelevant.⁸ Finally, Battaly emphasizes that being open-minded with respect to topic X entails a willingness to revise one’s beliefs about X (or formulate beliefs about X in the first place).⁹ Part of what it means to engage *seriously* with relevant intellectual

⁷Battaly’s conception of OM is similar to (but also importantly different from) the definition of OM that Jason Baehr defends in his book *The Inquiring Mind: On Intellectual Virtues and Virtue Epistemology*: “An open-minded person is characteristically (a) willing and (within limits) able (b) to transcend a default cognitive standpoint (c) in order to take up or take seriously the merits of (d) a distinct cognitive standpoint” (Baehr 2011*a*: 152).

⁸“Intellectual options,” according to Battaly, can include not just ideas and evidence but also questions, informational sources, and epistemological methods (one can be OM or CM with respect which questions one asks, which sources one consults, and which methods one uses).

⁹Battaly (2018*b*) clarifies that being open-minded (or closed-minded) with respect to topic X does not mandate having any existing beliefs or pre-established opinions about X. It is for this reason that she

options is to consider these options based on their merits and to be willing to revise one's beliefs in the face of persuasive counterevidence.¹⁰

I will address Q1 first, arguing that online epistemic bubbles and online echo chambers both threaten the trait of OM, albeit in different ways and to different degrees. The term "threaten" here can be understood in at least two ways. First, online echo chambers and epistemic bubbles may lead to the deterioration of the trait of OM that is already present in a digital user's character. Second, online echo chambers and epistemic bubbles may prevent a digital user from developing OM in the first place. This speaks to the difference between online echo chambers and epistemic bubbles threatening the *retention* of OM versus the *development* of OM.

Before proceeding, it is worth flagging that, like the trait of OM, online echo chambers and online epistemic bubbles also tend to be domain-specific, meaning that they are often oriented around a particular topic or set of topics. Moreover, these online environments need not be political in nature; online echo chambers and epistemic bubbles can form around practically any topic, such as cryptocurrency, anti-vaccination, and specific diets or exercise programs. Domain-specific online echo chambers and epistemic bubbles are poised to engender domain-specific closed-mindedness. For example, a Twitter user trapped in an anti-vaccination online echo chamber may be closed-minded regarding the topic of vaccination but open-minded about a range of other topics. Other online echo chambers and epistemic bubbles, however, may be more ideologically all-encompassing, in that they are formed around various loosely related cultural and political viewpoints and identities. Ideologically all-encompassing online echo chambers and epistemic bubbles like these may engender a more general psychological disposition of closed-mindedness.

Consider first Q1 from the perspective of online epistemic bubbles. Digital users in online epistemic bubbles fail to consider relevant intellectual options simply because they have not been exposed to them. At first pass, there is a sense in which such users may be considered closed-minded given that they are *unable* to engage seriously with certain intellectual options (due to a lack of access to these options).¹¹ However, the fact that someone has not been exposed to relevant intellectual options does not suggest that they would be *unwilling* to engage seriously with these options if they were made aware of them. It is consistent to say that subject S is open-minded with respect to perspective X on topic Y even though S has never been exposed to X. This is because the character trait of OM is a disposition, meaning that it concerns how a subject *would* behave under specified conditions. Thus, Sally may be disposed to engage seriously with sustainability-based arguments for nuclear power even though she has never been exposed to these arguments before

conceptualizes dogmatism as a type of closed-mindedness. Dogmatism, according to Battaly, is "an unwillingness to engage seriously with relevant alternatives to *the beliefs one already holds*" (262).

¹⁰For the sake of simplicity, I have chosen to constitutively build the "belief revision" component of the conceptual analysis of OM into the "engage seriously" component, although it is possible to separate the two. Battaly (2020) claims that one can engage seriously with intellectual options while simultaneously being unwilling to revise one's beliefs regarding these intellectual options.

¹¹Battaly (2018b) explains that it is controversial whether someone who is willing, but unable, to engage seriously with relevant intellectual options qualifies as closed-minded. She argues that such a person fails to possess the disposition of closed-mindedness but may be considered closed-minded relative to their epistemic environment. For the sake of simplicity, I will assume that closed mindedness necessitates an unwillingness (and not merely an inability) to engage seriously with relevant intellectual options.

because she inhabits an online epistemic bubble that omits arguments in favor of nuclear power.

This being said, one can discern how online epistemic bubbles have the capacity to undermine OM through a process that Nguyen calls *bootstrapped corroboration*:

Users of social networks and personalized search technologies will encounter agreement more frequently and so be tempted to over-inflate their epistemic self-confidence. This danger threatens because, in general, corroboration is often a very good reason to increase one's confidence in the relevant beliefs. But corroboration ought to only have weight if it adds something epistemically, rather than being a mere copy. To borrow an example from Wittgenstein: imagine looking through a stack of identical newspapers and treating each next newspaper headline saying p as a reason to increase your belief that p. This is clearly a mistake; the fact that a newspaper claims that p has some epistemic weight, but the number of copies of that newspaper one encounters ought not add any extra weight. (Nguyen 2020: 144)

To summarize, digital users who are members of online epistemic bubbles can obtain the false impression that everyone agrees with them about topic X or at least that there is more consensus on topic X than exists, which can, in turn, lead them to unjustifiably increase their epistemic confidence in their beliefs about X. This unjustified increase in epistemic confidence, in turn, poses a *prima facie* threat to OM. The basic line of reasoning I have in mind is as follows:

The bootstrapped corroboration argument for how online epistemic bubbles threaten open-mindedness:

- P1. Online epistemic bubbles can dispose their members to over-inflate their epistemic confidence about topic X via bootstrapped corroboration.
- P2. Digital users with an over-inflated sense of epistemic confidence about topic X are, other things being equal, more likely to display an unwillingness to engage seriously with relevant intellectual options that contradict or undermine their beliefs about X.
- P3. OM consists in having a disposition to engage seriously with relevant intellectual options.
- C. Therefore, online epistemic bubbles threaten to undermine the virtue of OM.

The basic idea behind this argument is that the epistemic vices of intellectual arrogance and closed-mindedness often go hand in hand or are correlated with one another. One prominent account of intellectual arrogance in the virtue epistemology literature based on *the limitations-owning conception of intellectual humility* holds that intellectual arrogance involves a disposition to underestimate one's intellectual limitations and overestimate one's intellectual strengths (Whitcomb *et al.* 2017). Individuals with an overinflated sense of epistemic confidence tend to underestimate their intellectual limitations. Consequently, they are in danger of cultivating the vice of intellectual arrogance according to the limitations-owning account of intellectual humility. Intellectual arrogance and closed-mindedness often hang together because people who are overly confident that their views are true are, other things being equal, more likely to dismiss relevant counterevidence that suggests their beliefs are false. Put differently, intellectually arrogant people typically think that they do not need to engage

seriously with counterarguments to their position because they are convinced that they already have all the correct answers on the subject under consideration.

To be clear, the above argument concerns the *conceptual* relationship between online epistemic bubbles and the virtue of OM and says nothing about the *empirical* data surrounding online epistemic bubbles. A prominent critique of the concept of online epistemic bubbles is that there is little evidence to support their widespread existence. Most empirical research in this area suggests that people are not only frequently exposed to contrary viewpoints online, but also often seek out and engage with relevant intellectual options that contradict their pre-existing beliefs (Bakshy *et al.* 2015; Beam and Kosicki 2014; Fletcher *et al.* 2020). Of course, the fact that digital users engage with ideological opponents on social media does not mean they are displaying open-minded behavior. If virtuous open-minded engagement were the norm online, one would expect less political polarization and more social convergence on controversial topics. Precisely the opposite is occurring, however. Studies indicate that while digital users are frequently exposed to (and engage with) opposite viewpoints in the digital realm, they are nevertheless becoming more polarized and likely to double down on pre-existing beliefs (Flaxman *et al.* 2016; Quattrociocchi *et al.* 2016). While the phenomenon of increasing political polarization is overdetermined, it seems that it can be partially (if only minimally) explained by the prevalence of online echo chambers.¹² Digital users engrossed in online echo chambers frequently engage with contrary perspectives, albeit in a manner that does not qualify as open-minded. To see how this is the case, it will be helpful to examine Q1 as it applies to online echo chambers.

3. Online echo chambers as a risk to open-mindedness

The process by which online echo chambers threaten OM is distinct from the process by which online epistemic bubbles do so. Recall that one must be disposed to engage *seriously* with relevant intellectual options to be open-minded. Members of online echo chambers may frequently engage with opposing views (e.g., frequently getting into political arguments on Twitter), but they do not qualify as open-minded insofar as their mode of intellectual engagement is not *serious*. A person's mode of intellectual engagement with an opposing viewpoint is serious and not dismissive only if the person makes a genuine attempt to understand and grapple with the merits of the opposing viewpoint and is willing to revise their beliefs about the topic under consideration. Members of online echo chambers often only engage dismissively with opposing intellectual options because they are disposed to automatically discredit such opinions. The following line of reasoning illustrates how online echo chambers threaten the cultivation and maintenance of OM.

The epistemic discrediting argument for how online echo chambers threaten open-mindedness:

¹²The assertion that contemporary political polarization can be (even partially) attributed to the prevalence of online echo chambers and epistemic bubbles is controversial. Levy (2021) argues that political polarization around Covid-related issues is not the result of echo chambers but rather unreliable higher-order evidence. Baumgaertner and Justwan (2022), on the other hand, explain how the preference for belief can generate political polarization in epistemic environments that are devoid of echo chambers or any mechanisms of information exclusion. I do not take a stance on this controversial topic here.

- P1. Online echo chambers dispose their members to epistemically discredit contrary intellectual options.
- P2. Digital users who are disposed to epistemically discredit contrary intellectual options will display an unwillingness to engage seriously with relevant intellectual options that contradict or undermine their beliefs.
- P3. OM consists in having a disposition to engage seriously with relevant intellectual options.
- C. Therefore, online echo chambers threaten to undermine the cultivation and maintenance of OM.

The basic reasoning behind this argument is relatively straightforward. P1 is just an expression of how echo chambers function, according to Nguyen (2020), whereas P3 is an expression of Battaly's (2018b) conception of OM. P2 is the connector premise, the idea being that online echo chambers dispose its members to engage dismissively with contrary intellectual options via the epistemic discrediting mechanism that characterizes these online environments. It is this epistemic discrediting mechanism that serves as the primary threat to OM in online echo chambers, just as it is the bootstrapped corroboration mechanism that serves as a threat to OM in online epistemic bubbles.

Before proceeding to the analysis of Q2, three clarifications are in order. First, online echo chambers pose a more significant threat to OM than online epistemic bubbles, other things being equal. This is because the "epistemic discrediting mechanism" characteristic of echo chambers is more epistemically destructive than the "bootstrapped corroboration process" found in epistemic bubbles. It is conceivable that a full-fledged member of an online epistemic bubble might preserve their OM. Being epistemically warped by the bootstrapped corroboration process will likely inflate one's epistemic confidence on a given topic, which will in turn potentially lead to intellectual arrogance with respect to that topic but not necessarily to closed-mindedness. By contrast, someone who is heavily influenced by an echo chamber's discrediting mechanism seems significantly likely (if not determined) to become closed-minded. Indeed, it is arguably the case that part of what it means to be a full-fledged member of an echo chamber is to be closed-minded to outside perspectives (at least within a given domain of knowledge).

The second clarification regards the order of causation between being a member of these online environments and possessing the disposition of closed-mindedness. Sometimes individuals who are already closed-minded gravitate toward echo chambers and epistemic bubbles, meaning that their participation in these environments is a result of their existing disposition, not the other way around. For example, a politically radical digital user who possesses a disposition to engage dismissively with contrary ideological options might join an online echo chamber for this reason, or a digital user who displays an unwillingness to engage at all with contrary ideological options might construct an online epistemic bubble for themselves, so they do not have to ever encounter other perspectives.¹³

Moving on to the third (and most important) clarification: the question of whether any given subject Y, who is trapped in an online echo chamber or epistemic bubble surrounding topic X, is closed-minded concerning topic X is complicated and contextually nuanced. Consider what Nguyen calls *the escape responsibility question*, which asks how

¹³These two examples embody the two general ways Battaly says one can be closed-minded: by engaging dismissively with relevant intellectual options or by failing to engage at all with relevant intellectual options.

responsible (or blameworthy) people are for becoming members of echo chambers and epistemic bubbles. Nguyen professes that some people are undoubtedly responsible for their immersion in such environments, giving the example of a person who, despite growing up in an epistemic environment that contains a diverse and reliable array of informational sources and perspectives, nevertheless chooses to enter an echo chamber or epistemic bubble of their own volition, because they find a sense of community and emotional comfort in the echo chamber.¹⁴ The escape responsibility question becomes more complicated, according to Nguyen, when one considers a person *raised* in an echo chamber who, through no fault of their own, adopts the beliefs and ideology of the in-group members. He asks us to imagine that “their earliest epistemic contacts – let’s say their parents, relatives, and close family friends – are all firmly committed members of the echo chamber. Suppose that the child is either home-schooled by those echo chamber members or sent to a school that reinforces the beliefs of that particular echo chamber” (Nguyen 2020: 154). Nguyen maintains that such a person is plausibly not responsible for their psychological disposition to discredit intellectual options that contradict the beliefs of their in-group ideology.¹⁵

I submit that such a person is not necessarily closed-minded *if epistemic internalism is true*. Epistemic internalism versus epistemic externalism is a central distinction in contemporary analytic epistemology that concerns the nature and grounds of epistemic justification, which is typically seen as a necessary condition for knowledge.¹⁶ However, the internalist/externalist distinction can also be used to delineate two differing views regarding relevancy restrictions on intellectual options. Recall that being open-minded involves engaging seriously with *relevant* intellectual options. Battaly (2018b) asserts that an intellectual option X counts as relevant on epistemic internalism if a subject has good reason to believe that X is true (or at least plausible) and irrelevant if a subject has good reason to believe that X is false (or at least implausible). Call this *the internalist condition* on relevancy restrictions. In contrast, *the externalist condition* on relevancy restrictions claims that an intellectual option X counts as relevant if X is objectively likely to be true and irrelevant if X is objectively likely to be false (Battaly 2018b).

Now envision a person raised in an anti-climate change online echo chamber named Cindy who, due to her education and epistemic upbringing, is disposed to automatically discredit any intellectual options that speak in favor of climate change. Assume further for the sake of argument that Cindy stood no reasonable chance of not being indoctrinated into the anti-climate change echo chamber because she was born into it and

¹⁴Jamieson and Cappella (2008) cite evidence that indicates that some people willingly enter echo chambers precisely because they provide a sense of community.

¹⁵One can also pose the escape responsibility question in the case of online epistemic bubbles. Consider a digital user who inadvertently becomes a member of an online epistemic bubble through algorithmic personalization. Is such a digital user responsible for their membership within the bubble? The answer may depend on what our standards of technological literacy are for the average digital user. Should we assume that the average digital user understands surveillance capitalism, recognizes the potential pitfalls of personalization algorithms, and possesses the digital literacy skills to sidestep these pitfalls? Expecting such technological literacy would have been unreasonable in 2013, but in 2023, it may be more justified to hold the average digital user to this standard, meaning that the user in question may be responsible for their immersion into an online epistemic bubble, even though such immersion is unintentional.

¹⁶Epistemic internalism maintains that whether a belief is justified depends solely on factors that are internal to the believer, such as their introspective access or mental states (Chisholm 1988). Epistemic externalism, on the other hand, avers that factors external to the believer can be relevant to the justification of a belief, such as the reliability of the process that generated the belief (Sosa 1991).

intellectually shaped by it. Given the veracity of the internalist condition, pro-climate change intellectual options can be genuinely deemed irrelevant *from Cindy's perspective*. If this is the case, and CM consists in an unwillingness to engage seriously with *relevant* intellectual options, then Cindy's unwillingness to engage seriously with pro-climate change intellectual options does not render her closed-minded.

However, even if the internalist condition about relevancy restrictions is true, and Cindy's mode of engagement surrounding the topic of climate change does not count as viciously CM, she still does not possess the virtue of OM insofar as (i) virtue requires responsibility and (ii) virtue requires epistemic reliability. Regarding (i): if the theory of virtue responsibility is true (Zagzebski 1996), then Cindy cannot be regarded as intellectually virtuous to the extent that she is not responsible for her beliefs and intellectual character traits.¹⁷ Regarding (ii): if a cognitive trait must reliably produce good epistemic effects (i.e., be truth-conducive) to count as a virtue, as is the case according to virtue reliabilism (Sosa 2007) and some versions of virtue responsibility (Zagzebski 1996), then Cindy's behavior cannot be regarded as intellectually virtuous to the extent that she reliably spreads falsehoods about climate change on the internet.

Notably, this third clarification concerning it being contextually nuanced whether a person's dismissive engagement with certain intellectual options counts as closed-minded holds true with respect to any view of relevancy restrictions and is not exclusive to the internalist condition. It is the case that Cindy's mode of dismissive engagement with pro-climate change intellectual options is closed-minded from the perspective of the externalist condition about relevancy restrictions. However, consider the following alternative example of a digital user named Michael who is raised in a *pro-climate change* online echo chamber. Such an online environment is an example of a *truth-conducive* echo chamber because it is permeated by largely true and reliable intellectual options. Suppose that being a member of this truth-conducive environment has disposed Michael to epistemically discredit (and engage dismissively with) any intellectual options that speak *against* climate change. Since CM consists in an unwillingness to engage seriously with *relevant* intellectual options, and anti-climate change intellectual options are genuinely irrelevant according to the externalist condition about relevancy restrictions given that they are objectively likely to be false, Michael's unwillingness to engage seriously with anti-climate change intellectual options does not render him closed-minded from the standpoint of the externalist condition (see Section 5 for more on the case of Michael).

To summarize my conceptual analysis in response to Q1: I presented and explained the bootstrapped corroboration argument and the epistemic discrediting argument, which illustrate how epistemic bubbles and echo chambers threaten OM by fostering a disposition to engage dismissively with contrary intellectual options. Then, I made three important clarifications. First, online echo chambers exhibit a higher propensity toward fostering CM compared to online epistemic bubbles. Second, while online echo chambers and epistemic bubbles can induce CM in their members, it is also possible that a digital user may join these online spaces due to pre-existing closed-mindedness.

¹⁷Virtue-responsibilism and virtue-reliabilism do not exhaust the possible positions one can take with respect to the nature of intellectual virtue. Heather Battaly has developed a third view that combines elements of both responsibility and reliabilism. The view, which she labels *personalism*, concurs with responsibility that intellectual virtues must be intellectual character traits but rejects the responsibility idea that intellectual virtues are necessarily praiseworthy or that we are necessarily responsible for possessing virtues (Battaly 2018a).

Third, the question of whether any given instance of dismissive intellectual engagement in an online echo chamber or epistemic bubble qualifies as closed-minded is contextually nuanced and highly dependent on one's viewpoint regarding relevancy restrictions on intellectual options.

4. Is it always virtuous to be open-minded in the context of online echo chambers and epistemic bubbles?

Thus far, this article has considered how online echo chambers and epistemic bubbles are poised to affect the cultivation and perseverance of a subject's open-mindedness. A different question that arises when contemplating the conceptual connection between these online environments and OM concerns how virtuous digital users should behave in the context of online echo chambers and epistemic bubbles:

Q2: Is it always intellectually virtuous to behave open-mindedly in the context of online epistemic bubbles and online echo chambers?

Q2 is intriguing because it raises the possibility that open-mindedness is not always an intellectual virtue. The notion that a subject can possess a cognitive character trait like OM without that trait being a virtue represents an approach to virtue epistemology that Ian Kidd (2020) calls *normative contextualism*. Normative contextualism mandates thinking about cognitive character traits as epistemically neutral and then reflecting upon what is required to transform these traits into virtues. According to normative contextualism, a given cognitive character trait X can be both virtuous and vicious, depending on the context in which it is deployed.

The normative contextualist question of whether the character trait of OM is always a virtue is related to, but not necessarily synonymous with, the debate over whether OM is always truth-conducive (Carter and Gordon 2014; Kwong 2017; Madison 2019). The theory of virtue-reliabilism says a cognitive character trait is virtuous only if it is truth-conducive. The reasoning in this section largely embodies a virtue-reliabilist perspective. As will be seen, Battaly (2021) frames her argument in reliabilist terms. While Nguyen (2020) does not take explicitly endorse any particular theory of virtue epistemology, his argument upholds that an excess of OM is truth-conducive for epistemically corrupted digital users trying to escape online echo chambers. Thus, this section effectively maintains that OM is not always a virtue because it is not always truth-conducive. Both CM and an excess of OM can also be truth-conducive in the context of online echo chambers and epistemic bubbles.

This section addresses Q2 specifically through the lens of *epistemically hostile* online echo chambers and epistemic bubbles. Epistemically hostile online echo chambers and epistemic bubbles are examples of what Battaly (2018b) calls "epistemically hostile environments," or environments that are "utterly saturated with intellectual options that are false, unreliable, or aimed at misdirection" (39). Echo chambers and epistemic bubbles are epistemically hostile environments if the actively discredited or omitted intellectual options are largely true and reliable. *Online* echo chambers and epistemic bubbles qualify as epistemically hostile if they are saturated with digital deception in the form of fake news articles, photoshopped images, computational propaganda, deepfake videos, etc. For example, the anti-climate change online echo chamber that Cindy inhabits is an epistemically hostile environment because it is permeated by fake (or at least misleading) news on the topic of climate change.

Not all online echo chambers and epistemic bubbles are epistemically hostile. As mentioned in the last section, it is possible for these epistemic environments to be truth-conducive in the sense that members of the online environment have largely true beliefs about the topic under consideration. This is seen in the case of Michael, who inhabits a pro-climate change online echo chamber in which the actively discredited voices are mainly false and unreliable (i.e., climate change deniers). In this section, I am solely concerned with epistemically hostile online echo chambers and epistemic bubbles rather than truth-conducive ones.¹⁸

I propose that what intellectual virtue entails in the context of epistemically hostile online echo chambers and epistemic bubbles is contingent upon whether these online environments have epistemically corrupted the digital user in question (i.e., whether the digital user is a member of the online environment).¹⁹ Battaly (2021) addresses Q2 from the perspective of a *knowledge-possessing* digital user who has not been epistemically corrupted by the online environment and is trying to navigate the polluted information space responsibly. Her argument pertains to a general epistemic predicament that she calls “polluted feed” (i.e., any social media feed that contains largely false and unreliable intellectual options), which includes both epistemically hostile online echo chambers and epistemic bubbles.

Drawing on the work of various epistemologists (Fantl 2018; Levy 2018, 2019; McIntyre 2018; Rini 2017), Battaly’s basic contention is that closed-mindedness functions as a reliabilist virtue (or what she calls an effects-virtue) for knowledge-possessing digital users because engaging closed-mindedly in epistemically hostile online environments is likely to produce better epistemic effects than engaging open-mindedly or failing to engage at all intellectually.²⁰ Doing nothing, or simply letting fake news and information pollution spread online without any resistance or counter-engagement, is epistemically bad, according to Battaly, because it will lead to the inculcation of false beliefs among many digital users, or at the very least, will cause digital users to doubt their true beliefs, resulting in a loss of knowledge (McIntyre 2018). However, this does not mean that the intellectually virtuous action is to engage open-mindedly with purveyors of information pollution and fake news online. Battaly offers several reasons to support the idea that engaging open-mindedly in epistemically hostile

¹⁸See Section 5 for a brief discussion of whether CM can be virtuous for members of truth-conducive echo chambers and epistemic bubbles.

¹⁹I use the term “epistemic corruption” loosely and do not have a precise definition of the concept in mind. Generally speaking, a digital user has been “epistemically corrupted” by an epistemically hostile environment if the environment has deteriorated their epistemic character in some meaningful way or caused them to adopt false beliefs or lose true beliefs. See Kidd (2018) for a more rigorous conceptual analysis of the notion of epistemic corruption.

²⁰The notion that closed-mindedness can be an epistemic virtue for knowledge-possessing agents is not novel. For instance, Sosa encapsulates the notion in discussing Kripke’s dogmatism paradox when he says: “Once you know that p, you can deduce...that any evidence contrary to p would be misleading, whereas positive evidence would probably do you little good. After all, by hypothesis you already know that p! Given this, you should close your mind to any new potential evidence to the question whether p. If positive, the evidence will do little for you; if negative, it will harmfully pull you away from the truth, and may even cost you the knowledge that you have” (Sosa 2014: 78). Notably, this line of reasoning in favor of virtuous closed-mindedness is significantly stronger than Battaly’s argument. Battaly makes the comparatively weak claim that closed-mindedness can *sometimes* be virtuous for knowledge-possessing agents *when navigating epistemically hostile environments*, whereas Sosa suggests in the above passage that closed-mindedness (with respect to relevant intellectual options that fall under one’s domain of knowledge) may *always* be virtuous for knowledge-possessing agents.

environments will not lead to a preponderance of good epistemic effects or at least a minimization of epistemic harm.

First, engaging open-mindedly with purveyors of fake news arguably does an epistemic disservice to third-party observers of the online interaction who have not yet made up their minds about the topic. This is because such open-minded engagement involves attributing a *credibility excess* to purveyors of fake news by creating the false impression (to ignorant outsiders at least) that they (e.g., climate change deniers) are experts on the relevant topic that are worth being taken seriously (Levy 2018, 2019). Second, OM engagement can lead to poor epistemic outcomes for the knowledge-possessing digital user. At best, according to Battaly, the open-minded digital user will amass epistemic opportunity costs by wasting time engaging with purveyors of fake news and “crackpot conspiracy theorists” instead of pursuing more valuable intellectual pursuits. At worst, the open-minded digital user subjects themselves to epistemic corruption in the sense that they may begin to doubt their own true beliefs by engaging open-mindedly with peddlers of information pollution.

For these reasons, Battaly concludes that engaging close-mindedly in epistemically hostile online echo chambers and epistemic bubbles is intellectually virtuous behavior for knowledge-possessing digital users, where “closed-minded engagement” means dismissive (instead of “serious”) intellectual engagement.²¹ There are two ways to pursue such virtuous closed-minded engagement, according to Battaly, both of which she claims are necessary to minimize the bad epistemic effects of online information pollution. First, digital users might engage dismissively with the epistemically hostile intellectual options themselves. An example of this direct kind of closed-minded engagement would be a social media user who publicly rejects a viral fake news story by commenting with a link that debunks it. Second, digital users might avoid engaging directly with the epistemically hostile intellectual options, and instead choose to engage with other elements of the epistemic environment in an effort to counteract such options. An example of this indirect kind of closed-minded engagement would be a social media user who reports a viral fake news story with the intention of getting it flagged as being misinformation. In both of these cases, the knowledge-possessing social media user is engaging closed-mindedly because they are making an effort to counteract the epistemically hostile intellectual options but are not considering the options on their merits and are unwilling to revise their beliefs.²²

²¹One might push back against Battaly’s argument by averring that she is overlooking or underemphasizing various bad epistemic effects associated with CM engagement. For instance, just as OM engagement runs the risk of conferring a *credibility excess* onto purveyors of fake news from the perspective of third-party observers, CM engagement arguably runs the opposite risk of conferring a *credibility deficit* onto the knowledge-possessing agent from the perspective of third-party observers. Such observers might mistakenly think that the knowledge-possessing agent is arrogant and not worth taking seriously if they are unwilling to engage open-mindedly on the topic. Similarly, while open-minded engagement with purveyors of fake news can cause the knowledge-possessing agent to doubt their own true beliefs, it is arguable that being closed-minded with respect to one’s knowledge that *p* can also cause one to lose epistemic justification for *p* (Cassam 2019).

²²Several of Battaly’s claims regarding the negative epistemic effects of open-minded engagement appear less persuasive when the knowledge-possessing digital user is navigating a hostile online epistemic bubble instead of a hostile online echo chamber. For instance, Battaly’s worry that OM engagement with members of hostile epistemic environments will cause the knowledge-possessing digital user to doubt their own true beliefs is clearly a concern in hostile online echo chambers, whose members will actively challenge and discredit these true beliefs. However, the same cannot be categorically stated for members of hostile epistemic bubbles, who are simply uninformed, and not necessarily dismissive, of valid counter perspectives. Of

Now consider Nguyen's (2020) approach to Q2. Unlike Battaly, Nguyen addresses Q2 from the perspective of a digital user who has been epistemically corrupted by an epistemically hostile online echo chamber or epistemic bubble and needs to escape. He poses what he calls the *escape route question*, which asks how someone escapes echo chambers and epistemic bubbles once engrossed within them. Nguyen claims that escaping *online epistemic bubbles* is relatively easy: all one must do is be exposed to intellectual options excluded by the bubble. However, escaping *online echo chambers* is a more onerous task, according to Nguyen. Consider again an epistemically hostile online echo chamber centered around climate change denialism. Suppose that members of this echo chamber deny the reality of climate change (or at least that climate change is caused by human activity) and believe that academics and climate scientists only promote climate change for personal or political gain (e.g., receiving tenure or promoting one's leftwing agenda). Exposing a member of this online echo chamber to a paper published by a famous climate scientist will not help them break free of the echo chamber but will likely only confirm their pre-existing distrust in climate scientists and feed into the discrediting narrative surrounding climate change they have been sold. In other words, encountering a paper on climate change may induce a cognitive bias known as the *backfire effect*, which occurs when a person's pre-existing beliefs are reinforced rather than changed by receiving information that contradicts their beliefs.²³

Ultimately, Nguyen avers that escaping an echo chamber likely requires a *social epistemic reboot*, which involves temporarily suspending all of one's credentialing beliefs or beliefs about which testimonial sources are credible and trustworthy. This kind of social epistemic reboot can be likened to a less radical version of Descartes' famous method of doubt because it only mandates suspending one's credentialing beliefs instead of all their beliefs about the external world. The scope of the social epistemic reboot that one must perform will depend on the scope of the echo chamber one is trapped within. If one is trapped in a domain-specific echo chamber surrounding the topic of vaccination, then performing a social epistemic reboot will only involve temporarily suspending one's credentialing beliefs as they relate to the topic of vaccination. By contrast, if one is trapped in a more ideologically all-encompassing echo chamber, the scope of credentialing beliefs that one must temporarily suspend to successfully perform the social epistemic reboot will be wider.

Engaging in a social epistemic reboot necessitates exhibiting an *excess of open-mindedness*. The idea is that members of online echo chambers can break free by being equally charitable to all sources of information, meaning that they should temporarily engage seriously with all the intellectual options they encounter. But to engage seriously with *all* (instead of just relevant) intellectual options is precisely to possess an excess of OM. Put differently, performing a social epistemic reboot means resetting one's trust levels of information sources, which entails treating all information sources (or at least surrounding some topic X) as relevant and worthy of serious engagement.²⁴

Nguyen's response to Q2 thus contrasts sharply with Battaly's, which maintains that a *deficiency of OM* (i.e., CM) functions as an intellectual virtue in the context of

course, this assumes that the members of the hostile online epistemic bubbles in question have not already been rendered closed-minded (CM) through the bootstrapped corroboration process outlined in Section 2.

²³Nguyen (2020) refers to this feature of echo chambers as a *disagreement reinforcement mechanism*.

²⁴While Nguyen (2020) describes how it is possible to escape echo chambers via a social epistemic reboot, he acknowledges that it is unrealistic to expect that members of echo chambers will be motivated to perform such a reboot, especially if the members have been rendered CM by the epistemic environment.

epistemically hostile online echo chambers and epistemic bubbles. Of course, Nguyen's analysis is compatible with Battaly's analysis, given that Nguyen focuses on digital users that have been epistemically corrupted by hostile online echo chambers and epistemic bubbles, whereas Battaly is concerned with knowledge-possessing digital users attempting to virtuously navigate these pernicious epistemic structures. The juxtaposition of Nguyen's (2020) and Battaly's (2021) respective discussions of Q2 illustrates the veracity of normative contextualism and the importance of not assuming that a cognitive character trait such as open-mindedness is necessarily an intellectual virtue regardless of the context in which it is exhibited.

Furthermore, contrasting Nguyen's and Battaly's arguments underlines a crucial nuance of normative contextualism: the term "context" is dual-faceted. While Nguyen and Battaly's arguments both pertain to the same *external environment* (i.e., an epistemically hostile online echo chamber) their proposed normative approaches diverge due to differing assumptions about the *internal constitution* of the digital user involved. This illustrates that "context," in the framing of normative contextualism, refers not only to the external epistemic environment in which an individual operates, but also to the internal cognitive disposition of the individual themselves (e.g., what beliefs or cognitive character traits they possess).

5. The bidirectional influence of the responses to Q1 and Q2

5.1. How the response to Q1 influences the response to Q2

Having addressed Q1 and Q2, I will now interlink the respective analyses. The conceptual findings from each inquiry are not separate entities but interact and influence each other in profound ways. I demonstrate how the conclusion derived from Q1 can be repurposed as an objection to the conclusion derived from Q2, and vice versa. Ultimately, these mutual challenges merely invite a deeper refinement of the conceptual analysis in response to both questions.

First, recall that in addressing Q1, I concluded that whether examples of dismissive intellectual engagement in online echo chambers or epistemic bubbles qualify as closed-minded is contextually nuanced and depends, in large part, on what view of relevancy restrictions about intellectual options one adopts. There is a case to be made that this conclusion, to some degree, sabotages the idea that my response to Q2 establishes the veracity of normative contextualism. The objection I have in mind can be framed as follows:

Objection 1 (O1): Neither CM nor an excess of OM is ever virtuous in online echo chambers and epistemic bubbles. Rather, what is epistemically desirable in these online environments is always OM with respect to only truly *relevant* voices.²⁵

O1 is a natural response to make if one is an Aristotelian in the sense that they believe virtue always resides in the mean of any given character trait. Such an Aristotelian might draw on the discussion of relevancy restrictions on intellectual options from Section 3 to assert, contra Battaly (2021) and Nguyen (2020), that it is always the mean of OM that is virtuous and never its vice of deficiency or excess.

Consider first O1 as it applies to Battaly's argument. Supporters of O1 might concur with Battaly's prescribed behavior (i.e., the claim that knowledge-possessing digital

²⁵I am indebted to an anonymous reviewer for raising this possible objection.

users ought to engage dismissively with intellectual options from hostile online echo chambers and epistemic bubbles), but contest her framing, asserting that the online engagement she advocates for is not a demonstration of closed-mindedness, but rather selective open-mindedness with respect to only the truly relevant voices. Picture a knowledge-possessing digital user navigating a white supremacist or an anti-climate change online echo chamber. Advocates of O1 would maintain that this digital user does not fail to be open-minded by not engaging seriously with intellectual options like “white supremacy is true” and “climate change is fake” because these options are not relevant, and open-mindedness consists in engaging seriously only toward relevant intellectual options.

O1 can be raised from the perspective of both the internalist and externalist conditions regarding relevancy restrictions when applied to Battaly’s argument. Recall that an intellectual option counts as irrelevant according to the externalist condition if it is objectively likely to be false. Intellectual options that permeate epistemically hostile online echo chambers and epistemic bubbles are by definition objectively likely to be false, and thus irrelevant, by the lights of the externalist condition. From the standpoint of the internalist condition, the proponent of O1 can claim that knowledge-possessing digital users have good reason to believe that the ideas circulating in hostile online echo chambers and epistemic bubbles are false, and thus irrelevant.

Battaly (2021) herself anticipates and briefly addresses O1, framing it as follows: “Closed-mindedness pertains to *relevant* alternatives, but essentialist claims about racism, and fake cures for COVID-19, aren’t true or justified. So, why would they even count as relevant?” (10). In response to O1, Battaly endorses neither the internalist condition nor the externalist condition, but a third condition, which might be called *the pervasiveness condition about relevancy restrictions*. According to the pervasiveness condition, an intellectual option qualifies as relevant if and only if it is pervasive in the epistemic environment under consideration. This means that even absurd and blatantly false intellectual options like “climate change is a myth propagated by liberal elites” will be deemed relevant if they are sufficiently widespread online. Given the problem of fake news and the high prevalence of epistemically hostile intellectual options on the internet, many of such options will be considered relevant under this condition. Consequently, dismissive engagement with intellectual options emanating from epistemically hostile online echo chambers and epistemic bubbles often counts as genuinely closed-minded from the perspective of the pervasiveness condition.

Needless to say, each view of relevancy restrictions on intellectual options has strengths and weaknesses.²⁶ Battaly states that a disadvantage of the internalist condition is that it arguably counts too few people as closed-minded, whereas a disadvantage of the externalist condition is that it arguably counts too many people as closed-minded. She further avers that a disadvantage of the pervasiveness condition is that it seemingly implies that the widespread *absence* of an intellectual option from an epistemic environment makes that option irrelevant, which is counterintuitive, especially if the intellectual option in question is true (see Battaly 2018b: 269–72). It is beyond the scope of this article to adjudicate the debate surrounding relevancy restrictions on intellectual options. The point that matters here is that the strength of O1 as it applies to Battaly’s argument (i.e., how many instances of dismissive engagement with intellectual

²⁶Battaly also suggests that the three views of relevancy restrictions about intellectual options may not even be mutually exclusive, as it is possible to combine them to form a larger disjunctive theory of relevancy restrictions.

options in epistemically hostile online echo chambers and epistemic bubbles count as closed-minded) depends upon which view of relevancy restrictions one endorses. Battaly accurately acknowledges that the strongest response to O1 is to endorse the pervasiveness condition.

What about O1 as it applies to Nguyen's (2020) argument that an excess of OM can be virtuous for epistemically corrupted digital users in hostile online echo chambers? Unlike Battaly's (2021) argument, the proponent of O1 cannot agree with the logic of Nguyen's reasoning but dispute its framing. When it comes to Nguyen's prescribed behavior: performing an epistemic reboot, or engaging with an excess of open-mindedness, implies treating *all* intellectual options (at least pertaining to some topic X) as relevant. The debate over which intellectual options count as relevant is therefore orthogonal to Nguyen's argument. Nevertheless, the proponent of O1 might challenge Nguyen's core reasoning (and not merely his framing), insisting on Aristotelian fashion that it is the mean of OM, not its excess, that is normatively desirable for an epistemically corrupted digital user who is a member of a hostile online echo chamber.

This objection does not stand up under scrutiny though. First, the objection is only workable assuming the externalist condition about relevancy restrictions on intellectual options. Theoretically, a digital user mired in epistemic corruption could escape from a hostile online echo chamber by only engaging seriously with intellectual options that are objectively likely to be true.²⁷ The problem, however, is that such a user by definition lacks the ability to reliably distinguish between true and false intellectual options due to their epistemic corruption, meaning that they will be unable to operationalize the mean of OM under the externalist condition about relevancy restrictions. This underscores why members of hostile online echo chambers need to heed Nguyen's advice and exhibit an excess of OM (i.e., perform an epistemic reboot) by temporarily treating all intellectual options (at least within a given cognitive domain) as relevant and worthy of serious engagement.

To summarize this subsection: O1 draws on the discussion of relevancy restrictions about intellectual options in Section 3 to challenge the idea that the conceptual analysis in Section 4 establishes the veracity of normative contextualism. According to O1, neither closed-mindedness nor an excess of OM is ever virtuous in the context of online echo chambers and epistemic bubbles, rather what is virtuous is always the mean of OM with respect to the truly relevant intellectual options. There are two main points to be made in response to O1. First, the objection can only be successfully applied to Battaly's (2021) argument, not Nguyen's (2020) argument. Second, the extent to which the objection applies to Battaly's (2021) argument depends on which view of relevancy restrictions one endorses, with the pervasiveness condition offering the most robust rebuttal.

5.2. How the response to Q2 influences the response to Q1

In the previous subsection, I explored how the discussion of relevancy restrictions in response to Q1 bears on the conceptual analysis in response to Q2. I will now address how the conceptual analysis in response to Q2 bears on the conclusion derived from Q1.

²⁷O1 as it applies to Nguyen's argument makes no sense from the perspective of either the internalist condition or the pervasiveness condition about relevancy restrictions. Engaging seriously with only pervasive intellectual options or intellectual options that the epistemically corrupted digital user has good reason to believe are true will not be epistemically beneficial or help them escape.

The response to Q2 establishes that CM is sometimes virtuous in the context of online echo chambers and epistemic bubbles. This conclusion might be taken to conflict with the assessment in Q1, which was framed in a way that may seem to suggest that it is always epistemically bad to be rendered closed-minded by online echo chambers and epistemic bubbles (e.g., I used the term “threat” when describing the capacity of these online environments to foster CM). This perceived contradiction is encapsulated in the following objection:

Objection 2 (O2): The responses to Q1 and Q2 appear at odds with each other. While the response to Q2 claims that CM can sometimes be virtuous when navigating online echo chambers and epistemic bubbles, the response to Q1 suggests that the undermining of OM in these environments is intrinsically epistemically harmful.²⁸

O2 does not represent a knockdown challenge to my argument but can instead be viewed as an invitation to clarify how the conceptual analyses in response to the two central queries cohere together. First and foremost, Battaly’s argument that CM can be virtuous pertains to closed-minded *actions*, not the *disposition* of CM. She explicitly says as much, claiming that her argument “contends that epistemically virtuous persons will perform closed-minded actions in polluted feed. But, it doesn’t claim that epistemically virtuous persons will have a general disposition of closed-mindedness or that the general disposition of closed-mindedness is an epistemic virtue. That would require further argument” (Battaly 2021: 6). This stands in contrast to the bootstrapped corroboration argument and the epistemic discrediting argument, both of which pertain to the disposition of closed-mindedness. With this clarification, the seeming inconsistency between the responses to Q1 and Q2 dissolves: the fact that it is sometimes virtuous to perform closed-minded *actions* in online echo chambers and epistemic bubbles does not imply that it is ever virtuous for these online environments to inculcate the *disposition* of CM.

However, in other work Battaly (2018a) does argue that the disposition of closed-mindedness can be virtuous for knowledge-possessing agents in certain epistemically hostile environments. While this work of Battaly’s (titled “Can Closed Mindedness be an Intellectual Virtue?”) does not consider hostile *online* environments in particular, one might plausibly think that her prescriptive reasoning in the polluted feed scenario extends beyond mere actions to include closed-minded dispositions.²⁹ Even if this is the case, O2 does not stand up to scrutiny because my response to Q1 only explains how echo chambers and epistemic bubbles have the capacity to foster the disposition of CM; it is agnostic with respect to whether their capacity to do so is invariably epistemically harmful. The terms “threat” and “risk” were used in a purely casual, value-neutral sense to describe how these online spaces can influence OM.

That said, Battaly’s (2021) argument (assuming it generalizes beyond CM actions to include CM dispositions) provides insight into why being rendered CM in a *truth-*

²⁸I am indebted to an anonymous reviewer for raising this possible objection.

²⁹Importantly, in maintaining that the disposition of CM can be an effects-virtue in epistemically hostile environments, Battaly is not claiming that the *general* disposition of CM is virtuous. Rather, her argument is that knowledge-possessing agents should be CM in these environments with respect to relevant intellectual options that conflict with what they already know. Thus, virtuous CM, according to Battaly, will be specific to the domain of knowledge that the agent in question possesses.

conducive online echo chamber or epistemic bubble *might* be epistemically beneficial for a digital user. Recall from Section 3 the case of Michael, who occupies a pro-climate change truth-conducive online echo chamber. Suppose that being embedded in this online echo chamber has disposed Michael to become closed-minded over time with respect to anti-climate change intellectual options via the epistemic discrediting mechanism described in Section 3. Is it normatively undesirable for Michael to acquire this domain-specific disposition of CM?

Not if Battaly's (2021) prescriptive reasoning applies to Michael's epistemic situation. Battaly's argument first and foremost applies to knowledge-possessing digital users who are *not* themselves members of epistemically *hostile* online echo chambers or epistemic bubbles but are trying to responsibly navigate such online environments. The scope of this argument ostensibly includes digital users like Michael who are themselves members of truth-conducive online echo chambers but are engaging with, and trying to responsibly navigate, epistemically hostile ones. If this is the case, then Michael's newfound disposition of closed-mindedness toward anti-climate change intellectual options is not epistemically problematic. Quite to the contrary, closed-minded engagement with such options is intellectually virtuous because it leads to a preponderance of good epistemic effects, or at least a minimization of bad epistemic effects, according to Battaly (2021). The upshot here is that it is arguably not always epistemically undesirable if a digital user occupying a truth-conducive online echo chamber or epistemic bubble surrounding topic X is rendered closed-minded with respect to X.

I submit that whether it can be epistemically desirable to be rendered closed-minded in a truth-conducive echo chamber or epistemic bubble ultimately depends on the more fundamental question of whether all echo chambers and epistemic bubbles (including truth-conducive ones) are epistemically problematic. To say that an echo chamber or epistemic bubble is "truth-conducive" is just to say that it is permeated by intellectual options that are largely true and reliable. It could be, however, that even truth-conducive echo chambers and epistemic bubbles are epistemically problematic, given that they lack informational or ideological diversity and have the capacity to undermine intellectual virtues and amplify cognitive biases. There is an ongoing debate in the literature on this question. Some scholars argue that echo chambers and epistemic bubbles can be epistemically good insofar as they are truth-conducive, thereby safeguarding true beliefs (Begby 2022; Elzinga 2022; Fantl 2021; Lackey 2021). For instance, Begby (2022) avers that while echo chambers are always epistemically bad from the point of view of collective rationality, they can be epistemically good from the perspective of individual rationality, as long as the echo chamber under consideration is truth-conducive (i.e., the actively discredited intellectual options in the echo chamber are largely false and unreliable options). Others contend that echo chambers and epistemic bubbles are always epistemically problematic even if they are truth-conducive (Avnur 2020; Ranalli and Malcolm 2023; Sheeks 2023). I do not take a position on this debate here, but only wish to flag that the debate determines whether it could ever be epistemically desirable to be rendered closed-minded in a truth-conducive echo chamber or epistemic bubble.

The basic line of reasoning I have in mind here can be represented by the following argument:

- P1. If echo chambers and epistemic bubbles are always epistemically harmful, then members of these epistemic environments should always escape them.

- P2. Echo chambers and epistemic bubbles are always epistemically harmful.
 C1. Therefore, members of echo chambers and epistemic bubbles should always escape them.
 P3. If members of echo chambers and epistemic bubbles should always escape them, then it is never epistemically desirable to be rendered CM by an echo chamber or epistemic bubble.
 C2. Therefore, it is never epistemically desirable to be rendered CM by an echo chamber or epistemic bubble.

Although Nguyen (2020) explains how it is possible to escape echo chambers and epistemic bubbles, he does not directly address the question of whether it is always desirable to escape.³⁰ A natural way to defend P1 and P2 is to contend that truth-conducive echo chambers and epistemic bubbles are always epistemically harmful in the sense that they erode one's knowledge over time. According to this contention, while Michael has true beliefs about climate change because he inhabits a pro-climate change online echo chamber, these true beliefs gradually lose justificatory status the longer he is a member of the online environment and is subject to its epistemically corrosive dynamics. If this is the case, then Michael should plausibly be focused on escaping the echo chamber by taking Nguyen's advice and exhibiting an excess of OM with respect to all climate change intellectual options rather than taking Battaly's advice by engaging closed-mindedly with anti-climate change intellectual options.

To summarize this subsection, O2 alleges that the conclusion in Q2 conflicts with the conclusion in Q1 since the former conclusion states that it can sometimes be virtuous to be CM in online echo chambers and epistemic bubbles, whereas the latter conclusion ostensibly assumes that it is always epistemically bad to be rendered closed-minded in these online environments. In response to this objection, I first explained that Battaly's argument (i.e., the former conclusion) pertains to closed-minded actions, whereas the bootstrapped corroboration and epistemic discrediting arguments (i.e., the latter conclusion) pertain to closed-minded dispositions. Second, I clarified that even if Battaly's argument generalizes to closed-minded dispositions, the response to Q1 is agnostic regarding whether it is always epistemically bad to be rendered closed-minded by online echo chambers and epistemic bubbles. It might be epistemically good to be rendered closed-minded in a truth-conducive online echo chamber or epistemic bubble if Battaly's prescriptive reasoning applies to members of the truth-conducive versions of these environments. Whether Battaly's prescriptive reasoning regarding CM being virtuous applies to such members depends on the controversial question of whether echo chambers and epistemic bubbles are always epistemically problematic. If truth-conducive echo chambers and epistemic bubbles are *not* inherently epistemically problematic, then it is plausibly not always epistemically undesirable to be rendered closed-minded by them. However, even if truth-conducive echo chambers and epistemic bubbles are always epistemically problematic, and it is always epistemically undesirable for these online environments to render their *members* closed-minded, it will still be true, according to Battaly (2021), that CM is virtuous for knowledge-possessing digital users who are *not members* of *any* online echo chamber or epistemic bubble but are trying to responsibly navigate epistemically hostile ones.

³⁰Sheeks (2023) takes a stance on this issue, arguing that while there is a sense in which echo chambers and epistemic bubbles could be considered epistemically good, such epistemic structures are nevertheless inherently epistemically problematic in that it is always desirable to escape from such structures.

6. Conclusion

This article has been an exercise in applied virtue epistemology; in particular, a subfield of applied virtue epistemology called *the virtue epistemology of the internet* (Heersmink 2018). One of the principal goals of the virtue epistemology of the internet is to question how online environments impact the nurturing of intellectual virtues (Q1), and how intellectual virtues manifest within online environments (Q2). While this inquiry can be addressed with respect to any number of virtues and online environments, this article has focused on open-mindedness and online echo chambers and epistemic bubbles. I analyzed the individual-level epistemic harms of online echo chambers and epistemic bubbles as they relate to the virtue of open-mindedness and explored whether it is always intellectually virtuous to engage open-mindedly in these online environments. First, I argued that online echo chambers and epistemic bubbles both threaten OM, albeit via different mechanisms and to different degrees. Then, following Nguyen (2020) and Battaly (2021), I argued that both an excess and a deficiency of OM can be virtuous in these online environments depending on the epistemic orientation of the digital user in question.

In the course of this analysis, the article presents a conceptual landscape of different kinds of online echo chambers and epistemic bubbles, including the distinctions between domain-specific versus ideologically all-encompassing versions of these online environments and epistemically hostile versus truth-conducive versions. These distinctions are not mutually exclusive but can be combined to systematically classify any given online echo chamber or epistemic bubble (e.g., an epistemically hostile domain-specific online epistemic bubble versus a truth-conducive ideologically all-encompassing online echo chamber).

A key concept for any scholar studying the internet from the perspective of virtue epistemology is what Schwengerer (2021) calls *online intellectual virtue*, which refers to the application of intellectual virtue to online environments. The development and maintenance of online intellectual virtues, according to Heersmink and Schwengerer, requires a background understanding of the online environments one inhabits (e.g., the topology, design features, and possible epistemic harms of such environments). The internet presents numerous epistemic dangers related to not just filter bubbles and personalization algorithms, but also data privacy, fake news, online radicalization, deepfakes, internet bots, and autocompleted web searches, among others. Digital users must develop online intellectual virtue to circumvent these epistemic dangers and ensure that information and communication technologies function as reliable epistemic tools. Digital users who have cultivated online intellectual virtue will understand the epistemic threat posed by online echo chambers and epistemic bubbles (Q1) and have the practical skills to navigate these online environments in an epistemically responsible manner (Q2). Such users will also appreciate the veracity of *normative contextualism*, meaning that they will recognize that whether a trait such as open-mindedness counts as an intellectual virtue depends upon the online context in which the trait is deployed.

To conclude, it is worth observing that in addition to examining how specific intellectual virtues are impacted by, and manifested in different online environments, the virtue epistemologist of the internet can also zoom out and ask: which virtues are the most conducive to knowledge on the internet? One might agree with the general thrust of my conceptual analysis in the article but insist that other virtues are more essential than OM for responsibly navigating online echo chambers and epistemic

bubbles. For instance, one might aver, contra Battaly (2021), that the virtue of *epistemic vigilance* (Levy 2022; Sperber *et al.* 2010) will be more effective for the knowledge-possessing digital user than closed-mindedness at maximizing overall epistemic effects (or at least minimizing overall epistemic harm) in the context of epistemically hostile online echo chambers and epistemic bubbles. Or one might argue, contra Nguyen (2020), that the virtue of *epistemic charity* (Berhow 2022) will be more beneficial than an excess of OM for epistemically corrupted digital users needing to escape epistemically hostile online echo chambers.³¹ Adjudicating which virtues are the most knowledge-conducive in different online environments is an essential task for the virtue epistemology of the internet that lies beyond the scope of this paper. Moving forward, the epistemological worries surrounding online echo chambers and epistemic bubbles, and the attendant significance of the virtue epistemology of the internet, will magnify as the “onlife” experience of digital users (Floridi 2014) becomes increasingly immersive.³²

References

- Avnur Y. (2020). ‘What’s Wrong with the Online Echo Chamber: A Motivated Reasoning Account.’ *Journal of Applied Philosophy* 37(4), 578–93.
- Baehr J. (2011a). *The Inquiring Mind: On Intellectual Virtues and Virtue Epistemology*. Oxford: Oxford University Press.
- Baehr J. (2011b). ‘The Structure of Open-Mindedness.’ *Canadian Journal of Philosophy* 41(2), 191–213.
- Bakshy E., Messing S. and Adamic L.A. (2015). ‘Exposure to Ideologically Diverse News and Opinion on Facebook.’ *Science* 348(6239), 1130–32.
- Battaly H. (2018a). ‘Can Closed-Mindedness be an Intellectual Virtue?’ *Royal Institute of Philosophy Supplement* 84, 23–45.
- Battaly H. (2018b). ‘Closed-Mindedness and Dogmatism.’ *Episteme* 15(3), 261–82.
- Battaly H. (2020). ‘Closed-mindedness and arrogance’. In A. Tanesini and M.P. Lynch (eds), *Polarisation, Arrogance, and Dogmatism: Philosophical Perspectives*, pp. 53–70. London, UK: Routledge.
- Battaly H. (2021). ‘Engaging Closed-Mindedly with Your Polluted Media Feed.’ In M. Hannon and J. de Ridder (eds), *The Routledge Handbook of Political Epistemology*, pp. 312–324. London, UK: Routledge.
- Baumgaertner B. and Justwan F. (2022). ‘The Preference for Belief, Issue Polarization, and Echo Chambers.’ *Synthese* 200(5), 1–27.
- Beam M.A. and Kosicki G.M. (2014). ‘Personalized News Portals: Filtering Systems and Increased News Exposure.’ *Journalism & Mass Communication Quarterly* 91(1), 59–77.
- Begby E. (2022). ‘From Belief Polarization to Echo Chambers: A Rationalizing Account.’ *Episteme*, 1–21. <https://doi.org/10.1017/epi.2022.14>.
- Berhow M.C. (2022). ‘Epistemic Charity in Times of Populist Polarization.’ In G.R. Peterson, M.C. Berhow and G. Tsakiridis (eds), *Engaging Populism*, pp. 165–182. Cham: Palgrave Macmillan.
- Boult C. (2021). ‘The (Virtue) Epistemology of Political Ignorance.’ *American Philosophical Quarterly* 58(3), 217–32.
- Bozdag E. and van den Hoven J. (2015). ‘Breaking the Filter Bubble: Democracy and Design.’ *Ethics and Information Technology* 17(4), 249–65.
- Carter J.A. and Gordon E.C. (2014). ‘Openmindedness and Truth.’ *Canadian Journal of Philosophy* 44(2), 207–24.
- Cassam Q. (2019). *Vices of the Mind: From the Intellectual to the Political*. Oxford: Oxford University Press.
- Chisholm R. (1988). ‘The Indispensability of Internal Justification.’ *Synthese* 74(3), 285–96.

³¹Berhow (2022) introduces the virtue of epistemic charity, explicitly contrasting it with and relating it to the virtue of open-mindedness. He argues that the cultivation of epistemic charity can help weaken the negative epistemic effects of populist polarization.

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- Clemente N.** (2022). 'Pedagogical Virtues: An Account of the Intellectual Virtues of a Teacher.' *Episteme* 1–15. <https://doi.org/10.1017/epi.2022.25>.
- Elzinga B.** (2022). 'Echo Chambers and Audio Signal Processing.' *Episteme* 19(3), 373–393. <https://doi.org/10.1017/epi.2020.33>.
- Fantl J.** (2018). *The Limitations of the Open Mind*. Oxford, UK: Oxford University Press.
- Fantl J.** (2021). 'Fake News vs. Echo Chambers.' *Social Epistemology* 35(6), 645–59.
- Ferkany M.A.** (2019). 'The Moral Limits of Open-Mindedness.' *Educational Theory* 69(4), 403–19.
- Figà Talamanca G. and Arfini S.** (2022). 'Through the Newsfeed Glass: Rethinking Filter Bubbles and Echo Chambers.' *Philosophy and Technology* 35(1), 1–34.
- Flaxman S., Goel S. and Rao J.M.** (2016). 'Filter Bubbles, Echo Chambers, and Online News Consumption.' *Public Opinion Quarterly* 80(S1), 298–320.
- Fletcher R., Cornia A. and Nielsen R.K.** (2020). 'How Polarized are Online and Offline News Audiences? A Comparative Analysis of Twelve Countries.' *The International Journal of Press/Politics* 25(2), 169–95.
- Floridi L.** (2014). *The Fourth Revolution: How the Infosphere is Reshaping Human Reality*. Oxford: Oxford University Press.
- Furman K.** (2023). 'Epistemic Bunkers.' *Social Epistemology* 37(2), 197–207.
- Heersmink R.** (2018). 'A Virtue Epistemology of the Internet: Search Engines, Intellectual Virtues and Education.' *Social Epistemology* 32(1), 1–12.
- Jamieson K.H. and Cappella J.N.** (2008). *Echo Chamber: Rush Limbaugh and the Conservative Media Establishment*. Oxford: Oxford University Press.
- Kidd I.J.** (2018). 'Epistemic Corruption and Education.' *Episteme*, 16(2), 220–235.
- Kidd I.J.** (2020). 'Epistemic Corruption and Social Oppression.' In I.J. Kidd, Q. Cassam and H. Battaly (eds), *Vice Epistemology*, pp. 69–85. London: Routledge.
- Kwong J.M.C.** (2016). 'Open-Mindedness as Engagement.' *Southern Journal of Philosophy* 54(1), 70–86.
- Kwong J.M.C.** (2017). 'Is Open-Mindedness Conducive to Truth?' *Synthese* 194(5), 1613–1626.
- Lackey J.** (2021). 'Echo Chambers, Fake News, and Social Epistemology.' In S. Bernecker, A.K. Flowerree and T. Grundmann (eds), *The Epistemology of Fake News*, pp. 206–227. Oxford: Oxford University Press.
- Lanier J.** (2018). *Ten Arguments for Deleting Your Social Media Accounts Right Now*. New York: Henry Holt and Company.
- Levy N.** (2018). 'Taking Responsibility for Health in an Epistemically Polluted Environment.' *Theoretical Medicine and Bioethics* 39, 123–41.
- Levy N.** (2019). 'No-Platforming and Higher-Order Evidence, or Anti-Anti-No-Platforming.' *Journal of the American Philosophical Association* 5(4), 487–502.
- Levy N.** (2021). 'Echoes of Covid Misinformation.' *Philosophical Psychology* 36(5), 931–48.
- Levy N.** (2022). 'In Trust We Trust: Epistemic Vigilance and Responsibility.' *Social Epistemology* 36(3), 283–98.
- Madison B.** (2019). 'Is Open-Mindedness Truth-Conducive?' *Synthese* 196(5), 2075–87.
- Marcum J.A.** (2017). 'Clinical Decision-Making, Gender Bias, Virtue Epistemology, and Quality Healthcare.' *Topoi* 36(3), 501–08.
- Mcintyre L.** (2018). *Post-Truth*. Cambridge, MA: MIT Press.
- Munroe W.** (2023). 'Echo Chambers, Polarization, and "Post-Truth": In Search of a Connection.' *Philosophical Psychology*, 1–32. <https://doi.org/10.1080/09515089.2023.2174426>.
- Nguyen C.T.** (2020). 'Echo Chambers and Epistemic Bubbles.' *Episteme* 17(2), 141–61.
- Nguyen C.T.** (2021). 'How Twitter Gamifies Communication.' In J. Lackey (ed.), *Applied Epistemology*, pp. 410–436. Oxford: Oxford University Press.
- Pariser E.** (2011). *The Filter Bubble: What the Internet is Hiding from You*. New York: Viking/Penguin Press.
- Paternotte C. and Ivanova M.** (2017). 'Virtues and Vices in Scientific Practice.' *Synthese* 194(5), 1787–1807.
- Quattrocchi W., Scala A. and Sunstein C.R.** (2016). 'Echo Chambers on Facebook.' *Economics of Networks eJournal*, 1–15. <http://dx.doi.org/10.2139/ssrn.2795110>.
- Ranalli C. and Malcolm F.** (2023). 'What's So Bad about Echo Chambers?' *Inquiry: An Interdisciplinary Journal of Philosophy*, 1–43. <https://doi.org/10.1080/0020174X.2023.2174590>.
- Riggs W.** (2010). 'Open-Mindedness.' *Metaphilosophy* 41(1–2), 172–88.
- Rini R.** (2017). 'Fake News and Partisan Epistemology.' *Kennedy Institute of Ethics Journal* 27(S2), 43–64.

- Rittberg C.J.** (2021). 'Intellectual Humility in Mathematics.' *Synthese* **199**(3–4), 5571–601.
- Schwengerer L.** (2021). 'Online Intellectual Virtues and the Extended Mind.' *Social Epistemology* **35**(3), 312–22.
- Sheeks M.** (2023). 'The Myth of the Good Epistemic Bubble.' *Episteme* **20**(3), 685–700. <https://doi.org/10.1017/epi.2022.52>.
- Sosa E.** (1991). *Knowledge in Perspective: Selected Essays in Epistemology*. Cambridge: Cambridge University Press.
- Sosa E.** (2007). *A Virtue Epistemology*. Oxford: Oxford University Press.
- Sosa E.** (2014). 'Knowledge and Time: Kripke's Dogmatism Paradox and the Ethics of Belief.' In J. Matheson and R. Vitz (eds), *The Ethics of Belief*, pp. 77–88. New York, NY: Oxford University Press.
- Sperber D., Clément F., Heintz C., Mascaro O., Mercier H., Origg G. and Wilson D.** (2010). 'Epistemic Vigilance.' *Mind and Language* **25**(4), 359–93.
- Sunstein C.R.** (2001). *Echo Chambers: Bush V. Gore, Impeachment, and Beyond*. Princeton: Princeton University Press.
- Sunstein C.R.** (2017). *#Republic: Divided Democracy in the Age of Social Media*. Princeton: Princeton University Press.
- Vallor S.** (2010). 'Social Networking Technology and the Virtues.' *Ethics and Information Technology* **12** (2), 157–70.
- Vallor S.** (2016). *Technology and the Virtues: A Philosophical Guide to a Future Worth Wanting*. Oxford: Oxford University Press.
- Whitcomb D., Battaly H., Baehr J. and Howard-Snyder D.** (2017). 'Intellectual Humility: Owning Our Limitations.' *Philosophy and Phenomenological Research* **94**(3), 509–39.
- Zagzebski L.T.** (1996). *Virtues of the Mind: An Inquiry into the Nature of Virtue and the Ethical Foundations of Knowledge*. Cambridge: Cambridge University Press.
- Zuboff S.** (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs.

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